

Ecology: The Biotic and Abiotic Environment

7-4 The student will demonstrate an understanding of how organisms interact with and respond to the biotic and abiotic components of their environments. (Earth Science, Life Science)

7.4.1 Summarize the characteristics of the levels of organization within ecosystems (including populations, communities, habitats, niches, and biomes).

Taxonomy level: 2.4-B Understand Conceptual Knowledge

Previous/Future knowledge: In 3rd grade (3-2.3), students recalled the characteristics of an organism's habitat that allow the organism to survive there. In 5th grade (5-2.2), students summarized the composition of an ecosystem, considering both biotic factors (including populations and communities).

It is essential for students to know that the levels of organization of the living world include the individual organism, populations, communities, ecosystems, and biomes. Each level is defined by the type and number of organisms or the abiotic factors present.

Populations

- All of the individuals of a given species in a specific area or region at a certain time.
- Members of a population compete for food, water, space, and mates; for example, all of the loblolly pines in South Carolina.

Communities

- All the different populations in a specific area or region at a certain time.
- For example, all of the crabs, seagulls, and sea grass at the beach are part of the same community.
- Communities involve many types of interactions among the populations.
- Some of these interactions involve the obtaining and use of food, space, or other environmental resources.

Ecosystems

- One or more communities in an area and the abiotic factors, including water, sunlight, oxygen, temperature, and soil.

Biomes

- Individual ecosystems grouped together according to the climate and the predominant vegetation and characterized by adaptations of organisms to that particular environment.

Within an ecosystem, organisms have specific places where their needs are met and specific roles within the ecosystem.

- The place where an organism lives in order to obtain its food, water, shelter and other things needed for survival is called its *habitat*.
- The particular role of an organism in its environment including type of food it eats, how it obtains its food and how it interacts with other organisms is called its *niche*. For example, the niche of a bee is to pollinate flowers as it gathers nectar for its food.

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It is not essential for students to know the specific interrelationships among organisms as this will be studied in high school biology, or the characteristics of the different types of biomes on Earth.

Assessment Guidelines:

The objective of this indicator is to *summarize* the characteristics of the levels of organization within ecosystems; therefore, the primary focus of assessment should be to generalize major points about the different levels of organization of the living world as well as habitats and niches in an ecosystem. However, appropriate assessments should also require students to *identify* the individual levels or habitats and niches; *illustrate* the levels using words, pictures, or diagrams; or *classify* by sequencing the levels of organization.